

2016-2017 PROJECT PLAN SUMMARY

Project Name:	A2-1-5 Atmospheric Deposition to Lakes and Snowpack
Type of Project:	Focused Study
Delivery Agent:	Environment and Climate Change Canada
Project Contact:	Derek Muir (ECCC) - derek.muir@canada.ca Jane Kirk (ECCC) - jane.kirk@canada.ca
Budget:	\$ 545,897

Project Description:

This project quantifies spatial and temporal trends and sources of atmospheric deposition of contaminants using snowpack and “paleo coring” approaches identified in the Canada Alberta Integrated Oil Sands Monitoring Plan. The focus is on investigation of current and historical atmospheric deposition of contaminants, source identification of key contaminants, as well as trends in ecological states of small lakes in the oil sands region via the use of paleolimnological methods. Atmospheric sources will be identified by analysis of source materials (petcoke, raw bitumen, mining dust, and air particulates) using advanced separation and isotope ratio methods. The work is also integrated with other studies.

Project Objectives:

Assess the importance of atmospheric deposition of contaminants as a contributor to ecological impacts of oil sands (OS) development, and ascertain sources by:

- Identifying atmospheric sources to snow, sediments and river waters
- Assessing long-term trends in winter-time atmospheric deposition
- Determining the potential impact of wintertime snowpack mercury loads on tributary river water mercury concentrations and
- Examining long-term trends in atmospheric polycyclic aromatic compounds (PAC), metals, and black carbon deposition using dated lake sediments cores.

Key Outcomes:

- Enhanced knowledge and predictive capabilities.
- Detailed data analyses and incorporation of community input to support recommendations for a long-term snow and paleo-coring monitoring program that is designed to inform other aspects of the OSM program.
- Deposition maps of contaminants (PACs, mercury, metals, water quality parameters, etc.) for the major oil sands development area.
- Quantification of the relative importance of sources such as petcoke and road haul dust to winter-time contaminant deposition to the landscape within 100 km of the major oil sands developments.
- Historical (pre- and post-development) understanding of contaminant deposition utilizing lake paleo-coring techniques.
- Contaminant concentrations data in snow and dated lake sediment cores.

Geographic Scope:

Oil Sands Monitoring (OSM)

Oil Sands development region (within ~200 km of major development areas), and downstream receiving environments

Associated Data and Reports:

Data and metadata records related to contaminant concentration in snow and data lake sediment cores. Reports including:

- Report on 2012-2014 PACs in Snow (peer reviewed paper).
- Temporal trends in metals and mercury deposition to the OS region using dated lake sediment cores
- Multi-year trends in mercury and metals deposition using snowpack measurements
- Creation of winter 2014-2015 Contaminant Deposition Maps using geostatistical interpolation.